

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

In the Matter of)		
)	Docket Nos.	52-029-COL
Progress Energy Florida, Inc.)		52-030-COL
)		
(Combined License Application for)		
Levy County Nuclear Plant, Units 1 and 2))	ASLBP No.	09-879-04-COL

PRE-FILED REBUTTAL TESTIMONY OF
KEVIN M. ROBERTSON, PhD
REGARDING IMPACTS ON WATER QUALITY AND THE AQUATIC ENVIRONMENT DUE TO
INCREASED NUTRIENTS RESULTING FROM DESTRUCTIVE WILDFIRES ALLEGEDLY
CAUSED BY DEWATERING

- Q1. Please state your name and business address.
- A1. My name is Dr. Kevin M. Robertson. My business address is 3205 Triton Circle, Tallahassee, FL 32312.
- Q2. Have you previously prepared testimony in this proceeding?
- A2. Yes. I prepared pre-filed direct testimony in this proceeding regarding the Intervenors' contention (Contention 4A, Part A, Section 5) which claimed that dewatering from Progress Energy Florida, Inc.'s ("PEF") proposed Levy County Nuclear Power Plant ("LNP") will cause destructive wildfires that will impact water quality and the aquatic environment by increasing nutrients. PEF400.
- Q3. What is the purpose of your rebuttal testimony?
- A3. The purpose of my rebuttal testimony is to respond to certain issues raised by Dr. Bacchus's direct testimony (INT301R) regarding Contention 4A, Part A, Section 5.
- Q4. Dr. Bacchus states that eutrophication will increase in the aquatic environment in the vicinity of the LNP from aerial deposition of particulate nitrogen associated with destructive wildfires due to hydroperiod alterations caused by the LNP. INT301R at pp. 38-39. Do you agree?
- A4. No. As set forth in my pre-filed direct testimony (PEF400), based on LNP site conditions (including projected drawdowns and soil characteristics) and potential sources of ignition, I conclude that the frequency of wildfires will not increase in response to hydroperiod alterations caused by the LNP. My direct testimony states that, under limited circumstances, fire *severity* (amount of fuel consumed) could increase in the 18% of

the worst case drawdown area that is comprised of organic soil areas in response to dewatering. However, even under these limited circumstances, the amount of additional fuel consumption attributable to dewatering and associated additional emissions, including emission of particles containing nitrogen, would be very small, and such fuel consumption and emissions would be within the range of historic natural conditions. In any case, it has been demonstrated that fires in an ecosystem similar to the LNP site did not increase eutrophication (the process by which water bodies receive excess nutrients) of nearby water bodies either by deposition of airborne particles containing nitrogen or otherwise. PEF405 at pp. 661-662. This is in part attributable to findings that most nitrogen (at least 99%) released to the air by a fire is in gaseous (non-nutrient) form (PEF406 at pp. 937-938), that the great majority of particulate matter (PM_{2.5}, which is particulate matter that is less than 2.5 microns) from a fire is convected to high elevations and thinly dispersed (PEF407 at pp. 359, 361, 380-381), and that the remaining particulates (primarily ash) have lateral transport distances typically much less than 100 meters (PEF408 at p. 223, Figs. 4 and 5).

In addition, Dr. Bacchus's testimony relies on INT386, which she incorrectly claims provides information regarding a 3,124 acre wildfire occurring in the Goethe State Forest. INT301R at p. 38. In fact, INT386 is an incident report of a 30 acre wildfire that occurred on PEF's property in late March and early April 2011. In any case, she argues that recent wildfires in the area are examples of "destructive wildfires that result from hydroperiod alteration, such as those associated with the proposed LNP and proposed mines in the vicinity." INT301R at p. 38. However, she presents no evidence, in INT386 or otherwise, that man-made dewatering caused or contributed to the fires' ignition, spread, fuel consumption, or emission of particulate matter, or that the fires were particularly "destructive." She also relies on a "Florida Highway Patrol warning" for which she does not provide a reference (INT301R at p. 38), and, in any event, such warnings pertain to highway safety rather than fire behavior and effects.

Q5. Dr. Bacchus states that destructive, long-lasting wildfires only occur in areas where the natural hydroperiod has been altered by excavations, groundwater pumping or a combination of those actions. INT301R at p. 38. Do you agree?

A5. No. Destructive, long-lasting wildfires are primarily associated with droughts and are not limited to areas with man-made dewatering. While Dr. Bacchus has pointed to recent wildfires in the Goethe State Forest as examples of man-made alterations to hydroperiods causing wildfires, she provides no empirical data or convincing argument

linking the wildfires to such alterations. INT301R at p. 38. In fact, she states earlier in her testimony that the period during which these observations were made was during a period of drought (INT301R at p. 27), which is sufficient to explain any unusually high fire severity in organic soil areas. Dr. Bacchus's testimony suggests possible impacts of man-made dewatering at the LNP based on reference to wildfires in a different location about which she provides no details to justify such a comparison, e.g., the amount of dewatering and coverage of different soil types that I evaluated in my direct testimony. For example, given that the natural range of water table fluctuations in the vicinity of the LNP site is up to 8 ft (NRC001 at p. 2-28), and given that most of the area within the projected worst case drawdown area (as defined in my direct testimony, PEF400 at pp. 3-4) is predicted to have increased drawdowns of less than 1 ft under the worst case scenario, I concluded that the contribution of such additional drawdowns to availability of organic soil fuel will be minor relative to the effect of natural fluctuations, and droughts in particular. PEF400 at pp. 8-9.

Q6. Dr. Bacchus claims that attempts to restore a more natural fire regime through controlled burns and rapid fire response have failed in areas where there has been hydroperiod alteration. She also claims that wildfires cannot be managed through those means. INT301R at p. 40. Do you agree?

A6. No. In my professional experience as a Fire Ecologist and Certified Prescribed Fire Practitioner ("burn boss") in Florida and other states for many years (PEF400 at p. 2), I have determined that prescribed burning at 1 to 3 year fire return intervals in flatwoods pine forests with embedded wetlands, such as those at the LNP, allows wildfires to be rapidly contained before spreading over large areas and minimizes fire severity. While Dr. Bacchus points to wildfires in Goethe State Forest to support her position that controlled burns will not be effective in controlling wildfires (INT301R at p. 40), most state and federal lands, including the Goethe State Forest, have failed to apply controlled burns at the 1 to 3 year fire return interval required to restore natural fuel conditions and easily control wildfires, primarily because of financial constraints on amount of personnel and equipment. PEF409 at pp. 38-41. An exception is the Apalachicola National Forest, where areas maintained with a 3 year fire return interval have successfully prevented uncontrollable wildfires in an ecosystem similar in topography and soil type to the LNP site (flatwoods embedded with cypress depressions). Thus, any failure to control wildfires in Goethe State Forest cannot be said to have occurred despite adequate controlled burning. It should be noted that, based on Florida Forest Service Data since 2006 (which is the extent of data available online), every wildfire within the township

containing the LNP site has been rapidly extinguished by fire suppression efforts, keeping each fire below 45 acres for fires on record, including the incident described in INT386. PEF410. These wildfires have been rapidly extinguished despite no controlled burning occurring in most of those areas. I also note that the conclusion in my direct testimony that LNP dewatering will not lead to a noticeable increase in nutrient concentrations in the water and aquatic resources due to wildfires is based on the projected level of drawdowns and the soil characteristics at the LNP, without crediting the beneficial impacts of controlled burns or rapid fire suppression. PEF400 at p. 12.

Q7. Dr. Bacchus states that an "issue resulting from wildfire is erosion." INT301R at p. 40. Do you have any response to that statement?

A7. Since it is my opinion that LNP dewatering will not result in increased wildfires, whether or not wildfires will lead to erosion at the LNP is not relevant. In any event, even in the case of severe wildfires, there would be insignificant erosion in the LNP's ecosystem because the soil is sandy and readily allows vertical infiltration of water rather than overland flow. PEF411 at p. 207. Furthermore, the topography is extremely flat, precluding erosion by formation of overland channels (interrill erosion) associated with slopes, and preventing rapid flow of overland water in the case of inundation, which minimizes sheet flow erosion. Finally, that ecosystem experiences rapid growth of herbaceous vegetation following a wildfire, notwithstanding any impact to trees, and herbaceous vegetation provides more value to soil stabilization than trees.

Q8. Does this conclude your rebuttal testimony?

A8. Yes.

I, Kevin M. Robertson, swear under penalties of perjury that the foregoing testimony is true and correct to the best of my knowledge and belief.


Signature

26 JUL 2012
Date